

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE
in its capacity as elected Office

Date of mailing (day/month/year) 31 October 2000 (31.10.00)	
International application No. PCT/SG99/00013	Applicant's or agent's file reference ST/63305
International filing date (day/month/year) 25 February 1999 (25.02.99)	Priority date (day/month/year)
Applicant KRISHNAMOORTHY, Ravishanker et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

16 August 2000 (16.08.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

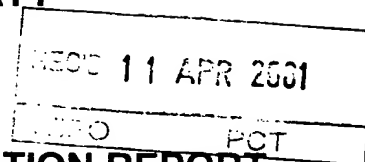
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PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference ST/63305	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/SG99/00013	International filing date (day/month/year) 25/02/1999	Priority date (day/month/year) [25/02/1999]
International Patent Classification (IPC) or national classification and IPC G11B19/20		
Applicant STMICROELECTRONICS ASIA PACIFIC PTE LTD et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 6 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 16/08/2000	Date of completion of this report 09.04.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Lehnberg, C Telephone No. +49 89 2399 2590 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/SG99/00013

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-10 as originally filed

Claims, No.:

1-10 as originally filed

Drawings, sheets:

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

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☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-10
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-10
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-10
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

I). CONCERNING POINT V:

1.1) Reference is made to the following documents:

D1: US-A-4 786 995

D2: US-A-4 679 102

1.2) Comparison of the subject matter of present claims 1 to 10 with the disclosure of D1 (see abstract, figures 1 to 3; column 2, lines 3-36; column 3, lines 28-48; column 4, line 16 to column 8, line 31) or with the disclosure of D2 (see column 3, line 1 to column 4, line 52) reveals that a method and a disk drive, in which in the event of loss of external power supply, the back-EMF energy of a first spindle motor or energy stored in a capacity during normal power supply is used to drive the motor of a positioning element in order to bring said positioning element to a rest position are already known.

Therefore, present independent claims do not meet the requirements of Rule 6.3.b) PCT and should have been drafted in the two-part form, clearly delimited in view of D1 or D2.

1.3) Nevertheless, none of the available prior art documents discloses nor suggests to connect and disconnect the first and second motors to the driving circuit in substantially out-of-phase synchronism to enable the second motor to be driven with the power derived from back-EMF of the rotating first motor.

Therefore independent claims 1, 3, 6 and 7 as well as dependent claims 2, 4, 5, 8, 9 and 10 are considered to fulfil the novelty and inventive step requirements of Articles 33(2)(3) PCT.

II). CONCERNING POINT VIII:

2.1) Present claim 1 is not considered to be supported by the description (Article 6 PCT), because of its too general wording. In fact, the invention concerns the driving of a voice coil positioning motor by the back EMF of a spindle driving motor. Such motors have specific characteristics which have to be taken into

account to perform the present invention. The present invention will certainly not function with all types of motors because e.g. the power of the motors may not be appropriate.

Therefore, the invention should be restricted to a spindle drive motor and a read head positioning motor as defined in the description.

- 2.2) Although claims 1, 3 and 6 directed to a method have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought. The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Hence, claims 1, 3 and 6 do not meet the requirements of Article 6 PCT.

In order to overcome this objection, it would have been appropriate to file an amended set of claims defining the relevant subject-matter in terms of a single independent claim in each category followed by dependent claims covering features which are merely optional (Rule 6.4 PCT).

- 2.3) It is moreover not clear what is meant by "or the like" in claims 2, 7, 9 and 10, so that these claims do not meet the clarity requirements of Article 6 PCT.
As said above in paragraph 2.1, the invention should have been restricted to what is defined in the description. Therefore, "or the like" should have been deleted.
- 2.4) In claim 3, it is not clear what the subject matter under protection really is. In fact, it is not clear what is meant by "In a disk drive.... a method". Is there a disk drive or a method which is defined?
- 2.5) If claim 3 is considered to define a method, this claim is equivalent to dependent claim 2 and is superfluous (Article 6 PCT - conciseness).
- 2.6) It is not really clear from claims 4, 5, 8, 9 and 10 what is meant by "upper and lower supply rails and upper and lower switching means" (Article 6 PCT).

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These definitions may have a signification when considering the location of these features in the figures, but do not correspond to a technical definition in relation to the other features.

- 2.7) - New independent claims (one directed to a method and one directed to a disk drive) should have been drafted in the two-part form and should have been clearly delimited in view of D1 (Rule 6.3.b) PCT).
- The description should have been adapted to new amended claims as required by Rule 5.1(a)(iii) PCT.
 - The features of the claims should have been provided with reference signs placed in parentheses (Rule 6.2(b) PCT).



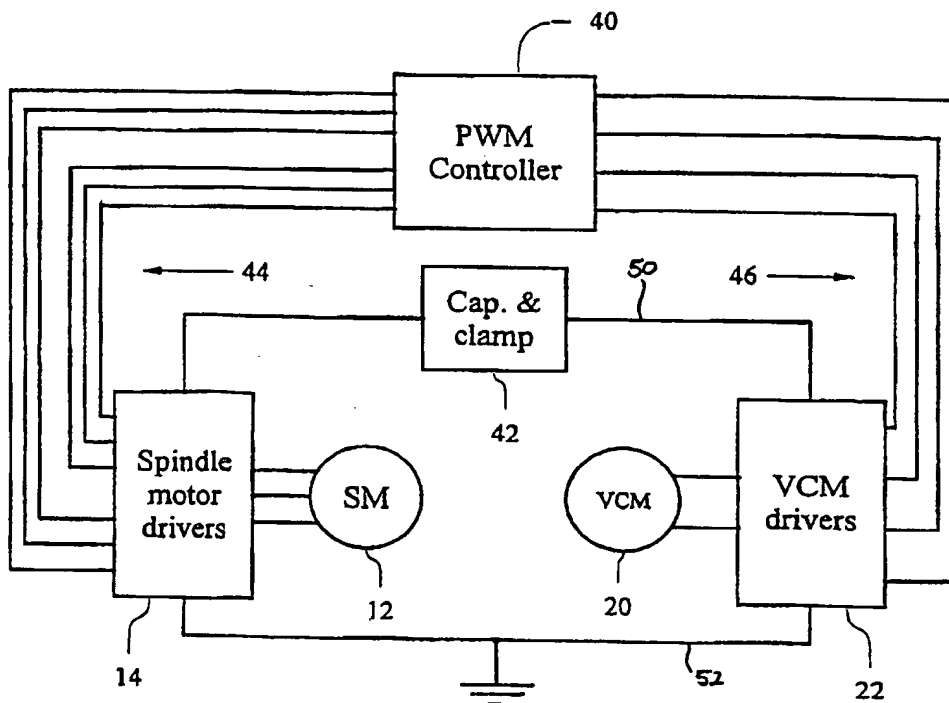
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : G11B 19/20, 21/12, 19/22		(11) International Publication Number: WO 00/51118
A1		(43) International Publication Date: 31 August 2000 (31.08.00)
(21) International Application Number: PCT/SG99/00013 (22) International Filing Date: 25 February 1999 (25.02.99) (71) Applicant (for all designated States except US): STMICRO-ELECTRONICS ASIA PACIFIC PTE LTD [SG/SG]; 28 Ang Mo Kio Industrial Park 2, Singapore 569508 (SG). (72) Inventors; and (75) Inventors/Applicants (for US only): KRISHNAMOORTHY, Ravishanker [IN/SG]; Block 565, 3 Ang Mo Kio Avenue #08-3421, Singapore 560565 (SG). FONG, Hin, Sing [SG/SG]; Block 452, 42 Jurong West Street #05-168, Singapore 640452 (SG). (74) Agent: DONALDSON & BURKINSHAW; P.O. Box 3667, Singapore 905667 (SG).		(81) Designated States: JP, SG, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report.

(54) Title: A METHOD AND APPARATUS FOR CONTROLLING A DISK DRIVE UNDER A POWER LOSS CONDITION

(57) Abstract

In a disk drive, a synchronized chopping scheme is described for deriving high peak currents from a coasting spindle motor under power down conditions to supply power to other circuits. These circuits need to perform certain functions to avoid physical damage to the data storage area as well as the read/write head. The maximum current that can be delivered by the back-emf (BEMF) in the spindle motor is limited by the motor parameters and the circuit elements. By synchronised out-of-phase chopping of the connections between a driving circuit and the spindle and head positioning motors, a storage capacitor in the driving circuit can be made much smaller, and the unused power dissipated as heat in a clamp circuit is minimized. This is achieved by directly transferring the energy from the spindle to the necessary circuits with synchronized control of the spindle and the circuits that need to operate under no power condition.



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EE	Estonia			SG	Singapore		

INTERNATIONAL SEARCH REPORT

International Application No

PCT/SG 99/00013

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G11B19/20 G11B21/12 G11B19/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H02P G11B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 786 995 A (STUPECK DONALD G ET AL) 22 November 1988 (1988-11-22) the whole document	1-10
X	US 4 679 102 A (WEVERS WILLIAM E ET AL) 7 July 1987 (1987-07-07) the whole document	1-10
A	EP 0 332 058 A (SIEMENS AG) 13 September 1989 (1989-09-13)	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

3 September 1999

Date of mailing of the international search report

09/09/1999

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/SG 99/00013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4786995 A	22-11-1988	US 4866554 A	12-09-1989
US 4679102 A	07-07-1987	AT 68906 T	15-11-1991
		AU 582529 B	23-03-1989
		AU 6539086 A	28-05-1987
		CA 1269753 A	29-05-1990
		DE 3682167 A	28-11-1991
		EP 0224378 A	03-06-1987
		HK 73492 A	02-10-1992
		JP 62219264 A	26-09-1987
EP 0332058 A	13-09-1989	NONE	